

# Water Conservation at the Science Museum of Minnesota

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# Company Background



- 2008: Energy Efficiency Project
  - Advanced heat recovery system
- 2017: Water Planet Initiative
  - Solutions for sustainable water use and reuse



# Project Overview

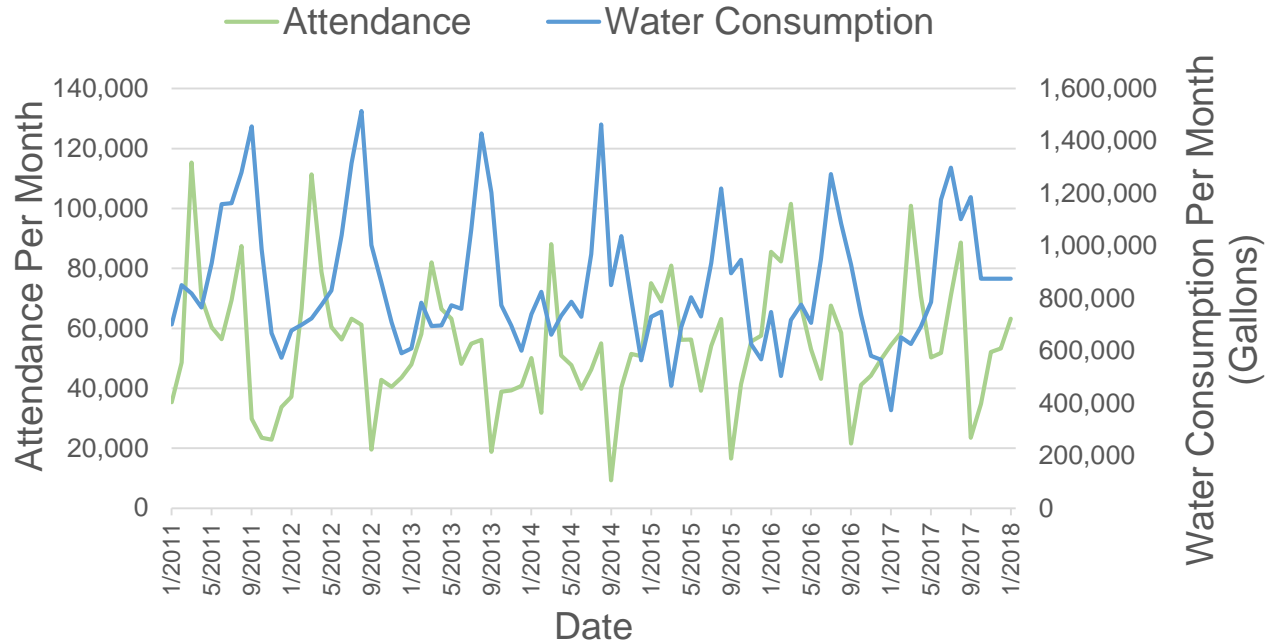
## •Annual Water Consumption:

- 10 million gallons
- 2 million for irrigation
- 3 million for restrooms

## •Annual Cost of Water:

- \$100,000

Comparison of Attendance and Water Consumption



# Approach

## Immediate Opportunities

### •Maintenance needs

- Improved fixtures in restrooms
  - Reduced GPF flushometers
  - 1 GPM aerators on non-automated sinks
- Irrigation changes
  - Change schedule timing
  - Implement data logs
  - Implement sensor technology





# Approach

## Long Term Opportunities

### •Water Planet Initiative

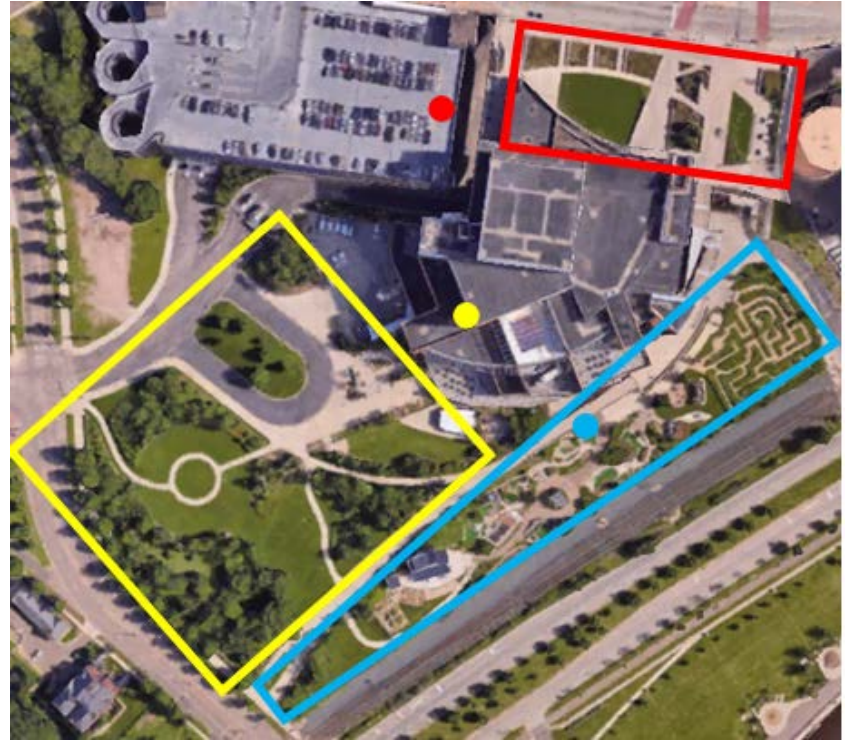
- Redo Museum Roof
  - Rainwater recapture from roof
- Redo Kellogg Plaza
  - Irrigation and snow/rainwater recapture from plaza
- Redo Big Back Yard
  - Educational water exhibits
- Greywater reuse
  - Use sink water for irrigation or in toilets



# Primary Recommendation: Immediate

## Change the Irrigation Schedule

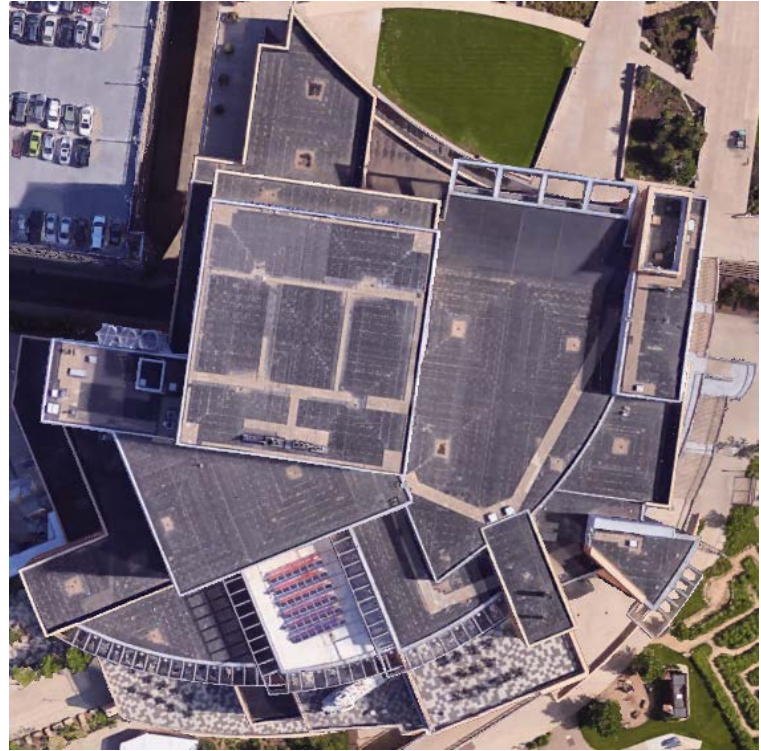
- **Annual reduction:** 859,900 gallons of water
- **Implementation Cost:** \$135
- **Net annual savings:** \$8,200
- **ROI:** 6 days
- **Status:** Recommended



# Secondary Recommendation: Long Term

## Roof Rainwater Capture

- **Annual reduction:** 1 million gallons of water
- **Annual savings:** \$10,200
- **Components:**
  - Storage tank
  - Large filter at tank entrance
  - Small filter at tank exit
  - UV disinfectant



# Other Solutions

Recommendation	Annual reduction	Total cost	Annual savings	Payback period	Status
<b>Irrigation</b>					
Irrigation smart controllers	296,200 gal water	\$315	\$2,800	3 months	Recommended
Snow and rainwater reuse in Kellogg Plaza	1.9 million gal water	Needs Analysis	\$18,300	Needs Analysis	Investigating
<b>Restrooms</b>					
Install 1 GPM aerators on non-automated faucets	57,700 gal water	\$551	\$552	1 year	Implemented 7/30
Install 0.5 GPF flushometers on urinals	350,000 gal water	\$2,700	\$3,300	9.5 months	Recommended
Install dual flush toilets (1.6 full/ 1.1 reduced)	588,400 gal water	\$10,000	\$5,300	22.5 months	Recommended
Faucet greywater reuse	375,000 gal water	Needs Analysis	\$3,600	Needs Analysis	Investigating





# Favorite Recommendation

## Dual-flush Toilets

- Flush **UP** for a 1.1 gallon reduced volume flush
- Flush **DOWN** for a 1.6 gallon full volume flush

1.1 GPF



1.6 GPF

